UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 6613

MSAS NO. 111

OVER THE

RED LAKE RIVER

DISTRICT 2 - PENNINGTON COUNTY, CITY OF THIEF RIVER FALLS

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 37)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 6613, the North Abutment and Piers 1 and 2, were found to be in good condition with no defects of structural significance. Pier 2 exhibited partial footing exposure at Section C, and the concrete strut connecting Sections A and B was also exposed. A light accumulation of timber debris was observed at Pier 2 and moderate accumulation was encountered at Pier 1. The channel bottom around the substructure units consisted of silty sand and random cobbles, which showed no evidence of significant scour and no appreciable changes since the last inspection.

INSPECTION FINDINGS:

(A) The footing at Section C of Pier 2 was exposed at 15.1 feet below the waterline around most of the pier section with a maximum vertical face exposure of 2 feet at the upstream end. In addition, the concrete strut connecting Sections A and B of Pier 2 exhibited 3 feet of vertical exposure. The top only of the footing at Section B of Pier 2 was also exposed 16.3 feet below the waterline on the southerly side.

(B) There was a light accumulation of 6-inch-diameter and smaller timber debris along Pier 2 on the channel bottom. A moderate accumulation of 1-foot-diameter and smaller timber debris was observed on the channel bottom to 5 feet above the channel bottom between Pier 1 Sections B and C and upstream of Pier 1 Section A.

(C) A vertical crack was observed in the construction joint from the top of cap to the channel bottom at the North Abutment, typically 1/16 inch wide and up to 1/8 inch wide at the bottom.

(D) Light scaling was observed on the shafts of Sections A and B at Piers 1 and 2 from the waterline to 2 foot below the waterline with a maximum penetration of 1/2 inch.

RECOMMENDATIONS:

(A) Monitor accumulated timber debris around both piers during future inspections, and if found to be increasing, removal operations may be required at that time.

(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 6613

Feature Crossed: Red Lake River

Feature Carried: MSAS No. 111

Location: District 2 - Pennington County, City of Thief River Falls

Bridge Description: The bridge superstructure consists of three spans of multiple steel girders supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two concrete piers. The piers each consist of three sections (A, B, and C). The pier and abutment footings are founded on steel H-piles. The piers are numbered starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Bradley A. Syler, P.E., S.E.

Dive Team: John J. Loftus, Valerie Roustan

Date: August 18, 2007

Weather Conditions: Sunny, 69 ºF

Underwater Visibility: 5.0 feet

Waterway Velocity: 0.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: North Abutment and Piers 1 and 2.

General Shape: The reinforced concrete hammerhead piers each consist of three sections. Sections A and B are tied together at the cap, with Section C a separate shaft and cap. The pier shafts are supported by rectangular reinforced concrete footings founded on steel H-piles. The reinforced concrete abutments consist of a transverse breast wall with perpendicular wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 17.1 feet.

4. WATERLINE DATUM

Water Level Reference: The top of Pier 2 on the northeast end.

Water Surface: The waterline was approximately 6.7 feet below reference.
Waterline Elevation = 1115.3.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code I/94

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

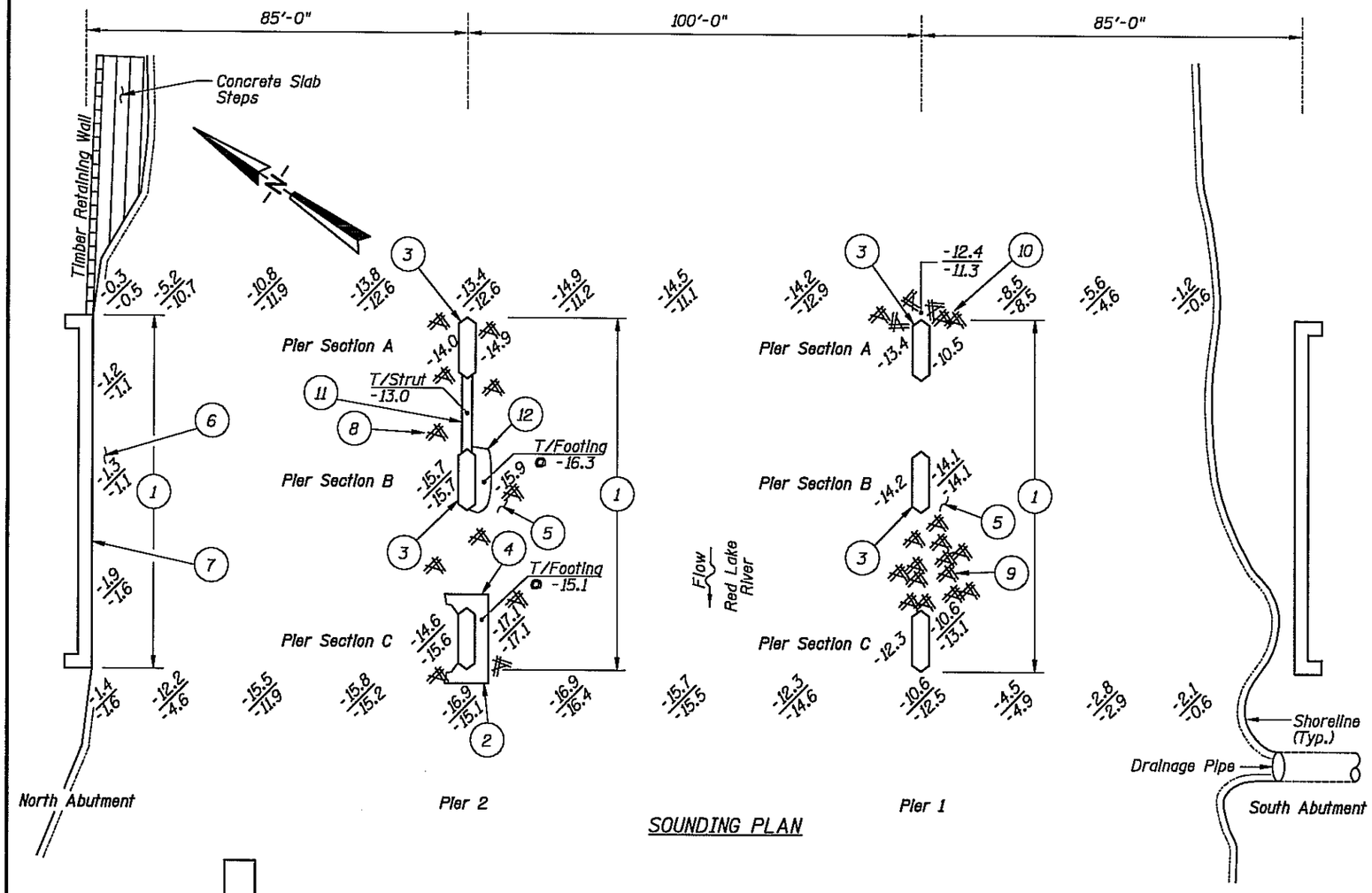
_____Yes X No

Photograph 1. Overall View of the Structure, Looking Southwest.

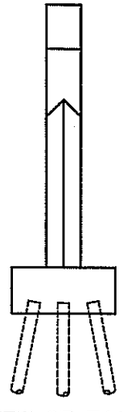

Photograph 2. View of Pier 1, Looking South.

Photograph 3. View of Pier 2, Looking South.

Photograph 4. View of North Abutment, Looking Northwest.



SOUNDING PLAN



TYPICAL END VIEW OF EACH PIER SECTION

GENERAL NOTES:

1. The North Abutment and Piers 1 and 2 were inspected underwater.
2. At the time of inspection, on August 18, 2007, the waterline was located approximately 6.7 feet below the top of Pier 2 on the upstream end. This corresponds to a waterline elevation of 1115.2.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units as well as around the pier structures.

Legend

-0.4 Sounding Depth (8/18/07)
-0.4 Sounding Depth (8/27/02)
Timber Debris

Note:

All soundings based on 2007 waterline location.

INSPECTION NOTES:

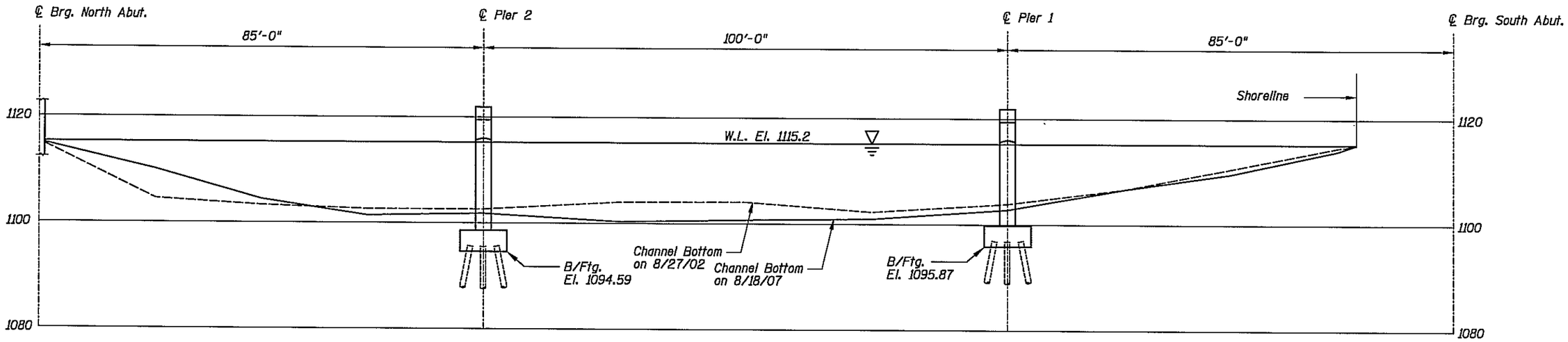
1. Overall, the concrete of the piers and abutment was smooth and sound with minor hairline cracking.
2. The top of the footing was exposed at 15.1 feet below the waterline along thesouth face, and upstream and downstream noses at Pier 2, Section C with a maximum vertical exposure of 2 feet.
3. Light scaling was observed on the shafts of Pier Sections A and B from the waterline to 2 feet below the waterline with a maximum penetration of 1/2 inch.
4. The timber footing formwork was observed extending up to 1 foot above top of footing around Section C of Pier 2.
5. The channel bottom at Piers 1 and 2 consisted of silty sand and random cobbles up to 12 inches in diameter with up to 1 foot probe rod penetrations.
6. The channel bottom consisted of silt at the North Abutment with probe rod penetrations of up to 1 foot.
7. A vertical crack was observed in the construction joint from top of cap to the channel bottom at the North Abutment, typically 1/16 inch wide and up to 1/8 inch wide at the bottom.
8. A light accumulation of 6-inch-diameter and smaller timber debris was observed along Pier 2 from the channel bottom to 2 feet above the channel bottom and up to 3 feet off the faces and noses.
9. A moderate accumulation of 1-foot-diameter and smaller timber debris up to 10 feet wide was observed from the channel bottom to 5 feet above the channel bottom between Pier Sections B and C.
10. A moderate accumulation of 1-foot-diameter and smaller timber debris was observed from the channel bottom to 5 feet above the channel bottom at the upstream nose of Pier Section A of Pier 1 the debris was 10 feet long (N/S) by 4 feet wide (E/W).
11. The concrete strut connecting Sections A and B of Pier 2 exhibited 3 feet of maximum vertical exposure at Pier Section B.
12. The top of footing was exposed at 16.3 feet below the waterline along the south side Section B of Pier 2 with no vertical exposure.

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

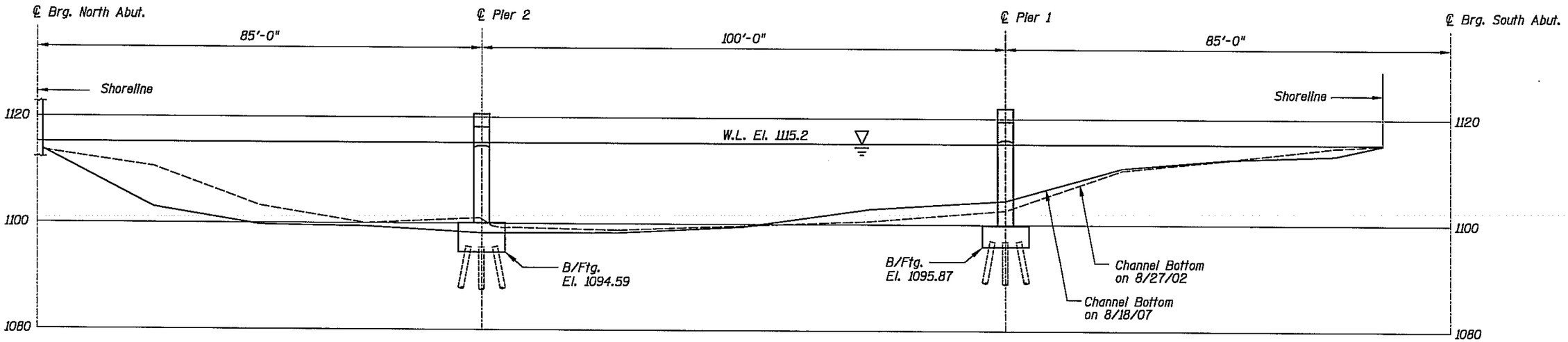
STRUCTURE NO. 6613
OVER THE RED LAKE RIVER
DISTRICT 2, PENNINGTON COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinseng.com	Date: AUGUST, 2007
Checked By: MDK		Scale: NTS
Code: 52210037		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

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UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: AUGUST 2007
Checked By: MDK		Scale: 1"=20'
Code: 52210037		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 18, 2007

ON-SITE TEAM LEADER: Bradley A. Syler, P.E., S.E.

BRIDGE NO: 6613 WEATHER: Sunny, 69 ºF

WATERWAY CROSSED: Red Lake River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: John J. Loftus, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Probe Rod, Lead Line, Sounding Pole, Scraper, Camera

TIME IN WATER: 4:00 p.m

TIME OUT OF WATER: 4:30 p.m

WATERWAY DATA: VELOCITY 0.5 f.p.s.

VISIBILITY 5.0 feet

DEPTH 17.1 feet maximum at Pier 2

ELEMENTS INSPECTED: North Abutment and Piers 1 and 2

REMARKS: Overall, the concrete was in good condition with no defects of structural significance. The footing at Section C of Pier 2 was exposed with a maximum vertical exposure of 2 feet. The top of the footing only was exposed at Section B of Pier 2. The concrete strut connecting the two upstream columns (Sections A and B) of Pier 2 was also exposed with a maximum vertical exposure of 3 feet. The pier shafts exhibited light scaling at the waterline with maximum penetrations of 1/2 inch. Light to moderate accumulations of timber debris were observed at Piers 2 and 1, respectively.

FURTHER ACTION NEEDED: X YES _____ NO

Monitor accumulated timber debris around both piers during future inspections, and if found to be increasing, removal operations may be required at that time.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 6613
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Bradley A. Syler, P.E., S.E.
WATERWAY CROSSED Red Lake River

INSPECTION DATE August 18, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	14.2’	N	7	N	9	N	7	7	N	N	6	6	7	N	N	N	N	N
	Pier 2	17.1’	N	7	7	9	N	7	6	N	N	7	6	7	N	N	N	N	N
	North Abutment	1.9’	N	7	N	9	N	7	8	8	8	N	8	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete was in good condition with no defects of structural significance. The footing at Section C of Pier 2 was exposed with a maximum vertical exposure of 2 feet. The top of the footing only was exposed at Section B of Pier 2. The concrete strut connecting the two upstream columns (Sections A and B) of Pier 2 was also exposed with a maximum vertical exposure of 3 feet. The pier shafts exhibited light scaling at the waterline with maximum penetrations of 1/2 inch. Light to moderate accumulations of timber debris were observed at Piers 2 and 1, respectively.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.